

New England Maple Sugarbush Pest Management Survey Summary

Survey questionnaire developed and mailings conducted
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INTRODUCTION

A 25-question survey was developed by the University of Vermont Cooperative Extension and distributed to lists of maple syrup producers in each of the New England states in summer 2009. Several questions required multiple responses (e.g. ratings for multiple insect-mite, disease, and weed pests in a single question), so the actual number of responses requested from each producer was closer to 56. Survey question design and mailing procedures followed the Dillman survey methodology (*Dillman 1978).

The New England Maple Sugarbush Pest Management Survey was conducted by the PRONewEngland pest management network with funding provided by the Northeastern IPM Center. The mailing list for each state was acquired by the following PRONewEngland state liaisons: CT - Candace Bartholomew, MA – Natalia Clifton, ME - Glen Koehler, NH - William Lord, RI – Margaret Siligato, and VT - Ann Hazelrigg and Sarah Kingsley-Richards. Special thanks to the maple syrup producers who responded to the survey, and to the specialists who provided editing on the survey questionnaire.

This report shows the responses to each question on the survey. The tables show the questions and answer options as they appeared in the survey questionnaire. The survey questionnaire and this response summary are available online at www.pronewengland.org.

*Dillman, Don A., *Mail and Telephone Surveys, The Total Design Method*. 1978. John Wiley and Sons Inc., NY

TEXT SUMMARY

Response rates across the six states were 17 – 36%. Vermont had the highest number of surveys sent and responses, with 52% (104 of 199) of the survey responses.

Vermont had the largest aggregate **acreage**, and also the largest median acres (40) per producer. Median acres per producer for the other states ranged from 12 to 25. Distribution of trees across 20-year **age classes** followed a normal distribution, with the highest portion of trees in 40-60 year old group. CT had a much higher portion (46%) of trees in the 80+ year group than the other states. This could be an anomaly due to the relatively few responses (6) received from CT producers.

The median number of **taps per acre** was 50, with 1st and 3rd quartile values of 27 and 72, respectively. The median **gallons of syrup per producer** was 180, with 1st and 3rd quartile values of 7.4 and 500 gallons, respectively. The median **gallons of syrup per acre** was 8.4, with 1st and 3rd quartile values of 4.8 and 15 gallons, respectively. The median **gallons of syrup per tap** was 0.2, with 1st and 3rd quartile values of 0.14 (= slightly more than a pint) and 0.26 gallons (= slightly more than a quart), respectively.

There were **large differences in marketing between large-scale and small-scale producers**. Bulk and wholesale sales were dominated by the largest producers, with less use by medium and small-scale producers. When weighted by volume of syrup, the distribution of sales across different markets was bulk (43%), retail (33%), wholesale (24%), and gift/personal use (1%). The difference between bulk and wholesale marketing was not specified in the questionnaire. If marketing was separated into three categories, then the **distribution of total syrup production by market channel was bulk/wholesale (67%), retail (33%), and gift/personal use (1%)** [Total exceeds 100% because of rounding].

However, market distribution is much different when averaged across producers (i.e. when small-scale and large-scale producers are weighted equally). **The portion of syrups sold retail averaged across producers (rather than gallons of syrup) was 57%, and more important than bulk/wholesale sales (37%), and gift/personal use (5%).** For some small-scale producers, gift/personal use accounted for a substantial portion of their production.

Over half (56%) of producers said their production method was **organic vs. conventional** (43%). But the survey did not define specific meaning of “organic.” A much lower portion (22%) of producers said their production was organically certified.

Insect pests: Defoliating Lepidopteran pests were ranked as four of the top seven insect and mite pests. With 36% out of a possible 100% frequency rating, Forest tent caterpillar was ranked as the most frequently problematic pest species. Other leaf feeding caterpillars - Gypsy moth, Maple leafcutter, and Saddled prominent, were ranked #3, 4, and 7 respectively.

The second most frequent pest was Sugar Maple Borer, a trunk-boring beetle that introduces decay into sugar maple trunks. Pear thrips (#5) and Lecanium scale (#6) were the only other insect and mite pests ranked above 10% out of possible 100% for frequency as a problem in maple sugarbushes. Pear thrips cause defoliation by feeding on swelling maple buds early in the spring. Lecanium scale stress maple trees by extracting fluid from leaves and twigs.

Even though no maple syrup producers reported use of insecticide in their sugarbush in a previous question, there were six reports for use of *Bacillus thuringiensis* (Bt) against forest tent caterpillar, indicating that these producers do not consider Bt to be an insecticide.

Diseases were ranked as even less frequent problems. Nectria canker was the only disease ranked about 10%. No maple syrup producers reported using fungicide in their sugarbush in 2008.

Weed frequency was ranked even lower than diseases. Eight respondents (4%) reported use of glyphosate herbicide, just slightly higher than the 3% of producers who reported use of herbicide in 2008.

Given the relatively **low frequency of pest problems and very low level of pesticide use**, it is not surprising that there were very few reports of worker activity in the sugarbush within 30 days after a pesticide application. Over 90% of respondents skipped this question. Only 1% of producers said they use formal pest monitoring methods such as traps and record keeping.

Vertebrate pests received higher frequency ratings than insects, diseases, or weeds. Five vertebrate pests had ratings over 10%: red squirrel (62%), deer (47%), woodpecker (42%), moose (34%), and porcupine (29%). Twenty seven percent of producers said they had managed vertebrate pests.

Use of a variety of **non-pesticide methods** was reported. The most common practice was **thinning or removal** of dead or undesirable trees, branches, and vegetation. This was most often done to remove other tree species from the sugarbush. The average portion of non-sugar maple trees in sugarbush stands was 27%. The most frequently named removed tree species were beech, Norway maple, and softwoods. Shrubs most frequently targeted for removal were barberry, buckthorn, and honeysuckle. Red squirrel and deer were most cited as being the target of management by shooting.

No single source dominated rankings of the most **important information sources**. State Associations, *The Maple Digest*, *The Maple News*, Educational meetings, University & Extension staff, and County forester & forest protection staff were all rated as important sources.

Asian longhorned beetle dominated three separate listings for research, education, and regulatory **priorities**. Even though this pest is not yet present in New England, maple syrup producers are very concerned about its potential for harm to their sugar maple trees.

SUMMARY TABLES

The tables below show summary values for survey responses.

Table 1. Number of surveys mailed, returned, and returned from active or inactive maple sugarbush managers. Question 1 = "Do you manage a sugarbush that produces maple syrup?"						
State	Number of names on maple sugarbush managers mailing list.	Number of surveys returned.	% of surveys returned.	Number of surveys returned, respondent answered "Yes" to question 1.	Number of surveys returned, respondent answered "No" to question 1.	% of mailed surveys with "Yes" response.
CT	28	6	21%	6	0	21%
MA	75	13	17%	9	4	12%
ME	74	20	27%	16	4	22%
NH	153	55	36%	46	8	30%
RI	4	1	25%	0	0	0%
VT	411	104	25%	81	23	20%
Overall	745	199	27%	158	39	21%

Summary calculations for tables below did not include cells in Table E1-6 that contain “—”. For responses given as a range, the mid-range value was used for calculation. Qualifiers such as “+” or “+/-” were ignored in calculations.

Table E1 Summary. How many acres of maple sugarbush did you manage in 2008?							
State	Sum	Average	Median	Minimum	1 st – 3 rd quartile	Maximum	Number of responses
CT	246	41	18	5	15 – 31	156	6
MA	349	39	25	2	15 – 50	90	9
ME	258	17	12	3	7 – 18	67	15
NH	1,796	40	20	1	10 – 50	255	45
RI	3	—	—	—	—	—	1
VT	7,650	98	40	0.5	17 – 80	800	78
Responses from all New England states							
ALL	10,302	67	25	0.5	15 – 60	800	154

Table E2a Summary. What is the approximate age range of your stand(s)?						
Age class	Average (% weighted by acres)	Median	Minimum	1 st – 3 rd quartile	Maximum	Number of responses
0 to 20 years	7% (7)	0%	0%	0 – 10%	80%	154
20 to 40 years	18% (16)	15%	0%	0 – 30%	90%	
40 to 60 years	35% (29)	30%	0%	15 – 50%	100%	
60 to 80 years	23% (22)	20%	0%	5 – 32%	100%	
> 80 years	17% (26)	10%	0%	0 – 20%	100%	

Table E2b Summary by State. What is the approximate age range of your stand(s)? (% of stand in different age groups). All values weighted by acreage.						
Age class	CT	MA	ME	NH	RI	VT
0 to 20 years	1%	2%	7%	6%	10%	8%
20 to 40 years	6%	14%	21%	12%	30%	18%
40 to 60 years	32%	48%	35%	39%	40%	25%
60 to 80 years	15%	29%	10%	30%	10%	20%
> 80 years	46%	7%	27%	13%	10%	30%

Table E3-4 Summary. How many taps did you put out in 2008? Over the past five years what is your average annual yield of maple syrup?						
	Average	Median	Minimum	1 st – 3rd quartile	Maximum	Number of values
Number of Taps (sum = 376,026)	2,490	1,100	6	425 – 2,500	50,000	151
* Taps per acre	53	50	0.8	27 – 72	200	148
Average Gallons Syrup (sum = 89,719)	590	180	2	74 – 500	12,000	152
* Gallons per Acre	10.8	8.4	0.2	4.8 – 15.0	39.7	148
* Gallons per Tap	0.21	0.20	0.01	0.14 – 0.26	0.61	149

* The 'Taps per Acre', 'Gallons per Acre', and 'Gallons per Tap' fields were not on the survey, but calculated from responses given to the 'Acres', 'Number of Taps', and 'Average Annual Yield' questions.

Table E5 Summary. What percentage of your maple syrup is sold through each of these markets?						
	Average (weighted by yield)	Median	Minimum	1 st – 3rd quartile	Maximum	Number of values
Wholesale	19% (24%)	5%	0%	0 – 30%	100%	155
Retail	57% (33%)	60%	0%	20 – 95%	100%	
Bulk	18% (43%)	0%	0%	0 – 23%	100%	
Gift, Personal use	5% (1%)	0%	0%	0 – 0%	100%	19

Table E6 Summary & E7. How would you describe your production practices? (Organic, Conventional, Other.) Is your sugarbush <u>certified organic</u> ?		
Production Type	Number of responses (%)	Percent weighted by acres
Organic	55 (35%)	56%
Conventional	97 (62%)	43%
Both	4 (3%)	1%
Organically certified? = Yes	11 (7%)	22%
Organically certified? = No	145 (93%)	78%

Table A1b. Insect pest weighted rankings.

Ranking points = number of “Annual pest” responses x 1 + Number of “Occasional pest” responses x 0.5.

“Never a problem”, “Unknown”, and no response all counted as zero.

Ranking percentage = Ranking points divided by “Highest possible ranking”.

Highest possible ranking = largest number of responses for any pest x 2. Thus, highest possible ranking is score if every person who responded to any insect pest question ranked a pest as “Annual pest”.

Highest number of responses for any insect pest was 150. If all 150 respondents had ranked an insect as an “Annual pest”, then that pest would have 150 ranking points and a 100% ranking percentage.

Rank	Pest	Ranking points	Ranking percentage
1	Forest Tent Caterpillar	53.5	36%
2	Sugar Maple Borer	37.5	27%
3	Gypsy Moth	35.5	24%
4	Maple Leafcutter	25.0	17%
5	Pear Thrips	23.5	16%
6	Lecanium Scale	18.5	12%
7	Saddled Prominent	14.5	10%
8	Maple Trumpet Skeletonizer	10.0	7%
9	Bruce Spanworm	7.5	5%
10	*Emerald Ash Borer	3.5	2%
11	*Asian Longhorned Beetle	1.5	1%

*As of 2010, Asian longhorned beetle has been found in one county of MA but not elsewhere in New England. Emerald ash borer is not known to be present in anywhere in New England.

Table A3b. Disease pest weighted rankings.

Same system used as described in Table A1b. Highest number of responses for any disease pest was 142. If all 142 respondents had ranked a disease as an “Annual pest”, then that disease would have 142 ranking points and a 100% ranking percentage.

Rank	Pest	Ranking points	Ranking percentage
1	Nectria Canker	15.5	11%
2	Maple Anthracnose	12.5	9%
3	Eutypella Canker	11.5	8%
4	Armillaria	7	5%

Table A5b. Weed pest weighted rankings.

Same system used as described in Table A1b. Highest number of responses for any weed pest was 145. If all 145 respondents had ranked a weed as an “Annual pest”, then that weed would have 145 ranking points and a 100% ranking percentage.

Rank	Pest	Ranking points	Ranking percentage
1	Buckthorn	8.0	6%
2	Honeysuckle	7.5	5%
3	Common Barberry	6.5	4%
4	Barberry (Japanese)	6.0	4%
5	Oriental Bittersweet	5.0	3%
6	Multiflora rose	3.5	2%
7	Garlic Mustard	2.5	2%
8	Euonymus (burning bush)	2	1%
9	Norway Maple	1.5	1%
10	Ferns	2	1%
11	Red maple	2	1%
12	Poison ivy	1.5	1%

Table A8b. Vertebrate pest weighted rankings.

Same system used as described in Table A1b. Highest number of responses for any weed pest was 145. If all 145 respondents had ranked a weed as an “Annual pest”, then that weed would have 145 ranking points and a 100% ranking percentage.

Rank	Pest	Ranking points	Ranking percentage
1	Red Squirrel	95.5	62%
2	Deer	72.5	47%
3	Woodpecker	65	42%
4	Moose	52	34%
5	Porcupine	44.5	29%
6	Others: Coyotes	13.5	9%
7	Fisher Cat	11	7%
8	Others: Bear	10	6%
9	Others: Gray squirrel (9), 3 not rated	6	4%

Table D1. Please select the option that best describes your use of monitoring for pests in your sugarbush (Circle the best answer)

Level of monitoring	Number of responses
No monitoring done	26 (19%)
Management based on informal observations	109 (80%)
Management based on formal monitoring (traps or other standard procedures and record keeping)	2 (1%)

Table D2b. Information source weighted rankings.
 Same system used as described in Table A1b. Highest number of responses for any source was 125. If all 125 respondents had ranked a source importance as “Very”, then that source would have 125 ranking points and a 100% ranking percentage.

Source (number of ratings)	Ranking points	Ranking percentage
State Associations (121)	66.0	53%
<i>The Maple Digest</i> (125)	63.0	50%
<i>The Maple News</i> (120)	62.5	50%
Educational meetings (119)	61.0	49%
University/Extension staff (120)	57.0	46%
County forester/Forest protection staff (114)	52.5	42%
Other producers (99)	49.0	39%
Web sites (108)	33.0	26%

RESPONSES TO INDIVIDUAL QUESTIONS

Table A1a. Which of these INSECTS are annual pests, occasional pests, or are never a problem in your sugarbush? (Please circle an answer for each). Number of responses of each type.

Pest (number of responses)	Annual Pest	Occasional pest	Never a problem	Unknown
Pear Thrips (142)	1	45	45	51
Gypsy Moth (141)	4	63	41	33
Forest Tent Caterpillar (150)	10	87	35	18
Maple Leafcutter (145)	3	44	35	63
Bruce Spanworm (138)	3	9	41	85
Sugar Maple Borer (140)	16	43	26	55
Saddled Prominent (138)	1	27	33	77
Maple Trumpet Skeletonizer (138)	1	18	34	85
Lecanium Scale (137)	2	33	36	66
*Asian Longhorned Beetle (139)	0	3	83	53
*Emerald Ash Borer (137)	0	7	66	137

Other insects/mites – Blackflies (1), Deerflies (1, same respondent). Each rated “Annual pest.”

*As of March 2011, Asian longhorned beetle found in one county of MA but not elsewhere in New England. Emerald ash borer not known to be present in New England.

Table A2. Were insecticides applied in your sugarbush in 2008? (Circle answer) Yes or No

Response	Number of responses)	Percent of responses
Yes	0	0%
No	158	100%

Table A3a. Which of these **DISEASES** are annual pests, occasional pests, or are never a problem in your sugarbush? (Please circle an answer for each). Raw data = number of responses of each type.

Pest (number of responses)	Annual Pest	Occasional pest	Never a problem	Unknown
Maple Anthracnose (141)	3	19	24	95
Nectria Canker (142)	5	21	25	91
Eutypella Canker (141)	3	17	26	95
Armillaria (142)	2	10	27	104
Other diseases – Cytospora (1) rated “Occasional pest”. Shoe-string and Root rot listed as other diseases by one respondent. These are alternate common names for Armillaria.				

Table A4. **Were fungicides applied in your sugarbush in 2008?** (Circle answer) **Yes** or **No**

Response	Number of responses)	Percent of responses
Yes	0	0%
No	156	100%

Table A5a. Which of these **WEEDS** (ANY SPECIES OTHER THAN SUGAR MAPLE) are annual pests, occasional pests, or are never a problem in your sugarbush? (Please circle an answer for each). Number of responses of each type.

Pest (number of responses)	Annual Pest	Occasional pest	Never a problem	Unknown
Buckthorn (145)	16	17	76	36
Barberry (Japanese) (143)	12	18	77	36
Common Barberry (144)	13	18	72	41
Honeysuckle (145)	15	15	87	28
Euonymus (burning bush) (142)	4	6	88	44
Garlic Mustard (141)	5	3	81	52
Oriental Bittersweet (144)	10	12	81	41
Norway Maple (144)	3	7	97	37
Others: Multiflora rose (5)	3	1		1
Others: Ferns (2)	2			
Others: Red maple (2)	2			
Others: Poison ivy (2)	1	1		
Others: Agipodium, Basswood, Hop hornbeam, Milkweed, and Fern hayscent listed once as annual pest. Blackberry listed once as occasional pest. Striped maple listed once with no rating.				

Table A6. What percentage of trees in your stand are other tree species?			
Number of Responses w/ value	Blank responses	Average response (Average weighted by acres)	Median response (1 st & 3rd quartile)
151	47	27% (23%)	20% (10% – 48%)

Table A7. Were herbicides applied in your sugarbush in 2008? (Circle answer) Yes or No		
Response	Number of responses)	Percent of responses
Yes	4	3%
No	152	97%

Table A8a. Which of these VERTEBRATES are annual pests, occasional pests, or are never a problem in your sugarbush? (Please circle an answer for each). Number of responses of each type.				
Pest (number of responses)	Annual Pest	Occasional pest	Never a problem	Unknown
Deer (151)	47	51	48	5
Red Squirrel (155)	58	75	18	4
Porcupine (149)	16	57	70	6
Fisher Cat (142)	5	12	108	17
Moose (151)	18	68	60	5
Woodpecker (148)	35	60	49	4
Others: Coyotes, Coy dogs (17), 1 not rated	11	5		
Others: Bear (12)	8	4		
Others: Gray squirrel (9), 3 not rated	6			
Others: Chipmunks, Coons, Skunks, Woodchuck each with (1) mention.				

Table A9. Have you ever managed these pests in your sugarbush? (Circle answer) Yes or No		
Response	Number of responses)	Percent of responses
Yes	43	27%
No	116	73%

Table B1. Please list the **NON-PESTICIDE METHODS** used to manage or prevent pests (if applicable), the pest(s) targeted, application details, and whether the control was excellent, good or poor. (Please fill in your answers – be as specific as possible)

For summary report, method and targeted pest entries consolidated into similarity groups for clarity.

Gray rows have summary values for each group of similar responses. For all columns, blank responses were ignored in calculating average.

For ‘Number of Times method used’, if range of values given as response, midpoint value used. Text entries (e.g. “Occasional”, “Constant” etc.) were ignored, or arbitrarily assigned a value for summary value as shown in ().

For ‘When Method Used’, responses given as a month name were translated to a season name for summary.

For ‘Type of Application and Effectiveness’, counts are for number of times that “Spot” and “Entire”; or “Excellent”, “Good”, “Fair” or “Poor” were mentioned.

For ‘Anticipated Loss’, “Unknown” responses ignored. Responses with “<” before number were counted as half the number, e.g. <50% counted as 25%.

Non-pesticide method(s)	Pest targeted	Number of Times Method Used in a Typical Year	When Method Used (Spring, Summer, Fall, Winter, or Month)	Type of Application (spot treatment, entire sugarbush, aerial etc.)	Effectiveness of Method (Excellent, Good, Poor)	Anticipated Loss of Yield if method not used (<25%, <50%, 50-75%, 100%,)
Thinning, Removal	All other species	1	Early winter	Spot	Good	Unknown
Thinning, Removal	All other species	1	Winter	Spot	Good	10 – 25%
Thinning, Removal	All other species	1 to 5	As time allows	Entire	Excellent	
Thinning, Removal	Any other tree	Every 5 to 10 years (0.15)	Summer/ Winter	Spot	Excellent	25%
Thinning, Removal	Any other tree	1	Summer/Fall	Spot	Excellent	
Thinning, Removal	Any other tree	1				
Thinning, Removal	Any other tree	1	Fall	Spot	Good	5%
Thinning, Removal	Any other tree	Occasional	As time allows	Spot	Good	Unknown
Thinning, Removal	Ash, Oak, Softwood	4	Winter/Spring Summer/Fall	Spot	Excellent	25%
Thinning, Removal	Balsam, Pine, Ash	1	Summer	Spot	Excellent	<25%
Thinning, Removal	Beech	1	Summer	Entire	Good	<25%
Thinning, Removal	Beech	1	Fall	Spot	Good	10%
Thinning, Removal	Beech	1	Spring	Spot	Excellent	10%
Thinning, Removal	Beech	1	Late Fall	Entire	Excellent	50%
Thinning, Removal	Beech	1	Summer	Spot	Good	0%
Thinning, Removal	Beech	Constant	Winter/Summer	Spot	Good	Unknown
Thinning, Removal	Beech, Birch, etc.	1	Winter	Spot	Good	
Thinning, Removal	Beech, Poplar	1 or less	Winter	Entire	Good	Unknown
Thinning, Removal	Birch	3	Fall	Entire	Excellent	5%
Thinning, Removal	Elm	1	Summer	Spot	Good	0%
Thinning, Removal	Hard maple	1	Fall	Entire	Good	Unknown
Thinning, Removal	Maple	1	Summer	Spot	Excellent	50%
Thinning, Removal	Maple & Beech	1	Fall		Good	25%
Thinning, Removal	Maple	1	Summer/Fall	Spot	Excellent	10%

Table B1 continued. Please list the **NON-PESTICIDE METHODS** used to manage or prevent pests.

Thinning, Removal	Maple	Occasional	As time is available	Spot	Good	Unknown
Thinning, Removal	Norway Maple	1	Fall	Spot	Good	25%
Thinning, Removal	Norway Maple	1	Ongoing	Spot	Good	<50%
Thinning, Removal	Norway Maple	2	April	Spot	Good	<20%
Thinning, Removal	Norway Maple	1	Summer	Spot	Unknown	Unknown
Thinning, Removal	Norway Maple	1	Winter	Spot	Excellent	<25%
Thinning, Removal	Norway Maple, etc.	Constant	Summer/Fall/Winter		Good	25%
Thinning, Removal	Softwood	1	Winter	Spot	Good	25%
Thinning, Removal	Softwood	1	Fall	Spot	Good	
Thinning, Removal	Softwood					
Thinning, Removal	Softwood, for crown release	2	Fall/Winter	Entire	Good	Unknown
Thinning, Removal	Spruce/Fir	6	Fall	Entire	Excellent	25%
Thinning, Removal	Sugar Maple	1	Fall/Winter	Spot	Good	<25%
Thinning, Removal	Tree stand index					
Thinning, Removal	Tree stand index		Winter/Spring Summer/Fall	Spot	Excellent	
Thinning, Removal		1	Summer/Fall	Spot	Poor	Unknown
Thinning, Removal			Winter			
Thinning, Removal		1	Late Winter	Spot	Good	<10%
Thinning, Removal		2	Spring/Fall			
		Average = 1.4	Winter – 15, Spring – 4, Summer – 14, Fall – 18.	Spot – 28, Entire – 8.	Excellent – 13 Good – 23 Fair – 0 Poor – 1	Average = 18%
Thinning, Removal	Canker	1	Spring/ Summer	Spot	Good	<25%
Thinning, Removal	Damaged trees	Every other year (0.5)	Summer/Fall	Spot	Good	20%
Thinning, Removal	Dead or broken	1	Summer/Fall		Excellent	
Thinning, Removal	Dead/Dying Trees	2	Summer/Fall	Spot	Excellent	20%
Thinning, Removal	Dead/Dying Trees	2 to 3	Summer/ Winter	Spot	Excellent	50 – 75%
Thinning, Removal	Dead/Dying Trees	Constant	Winter/ Summer	Spot	Excellent	Unknown
Thinning, Removal	Dead limbs	2	Spring/Fall			
		Average = 1.5	Winter – 2, Spring – 2, Summer – 6, Fall – 4.	Spot – 5, Entire – 0.	Excellent – 4 Good – 2 Fair – 0 Poor – 0	Average = 29%

Table B1 continued. Please list the **NON-PESTICIDE METHODS** used to manage or prevent pests.

Non-pesticide method(s)	Pest targeted	Number of Times Method Used in a Typical Year	When Method Used (Spring, Summer, Fall, Winter, or Month)	Type of Application (spot treatment, entire sugarbush, aerial etc.)	Effectiveness of Method (Excellent, Good, Poor)	Anticipated Loss of Yield if method not used (<25%, <50%, 50-75%, 100%,)
Thinning, Removal	Barberry	1 to 2	Fall	Spot	Good	0%
Thinning, Removal	Barberry	1	Summer	Spot	Good	0%
Thinning, Removal	Barberry, Honeysuckle	2 to 3	Summer/Fall	Entire	Fair	
Thinning, Removal	Barberry, Honeysuckle, Bittersweet	1	Winter	Spot	Excellent	30%
Thinning, Removal	Bittersweet	When seen	April & October	Spot	Good	<25%
Thinning, Removal	Buckthorn	1	Spring	Spot	Good	<25%
Thinning, Removal	Buckthorn	Many	Fall	Spot	Good	
Thinning, Removal	Burning Bush	1	Winter	Spot	Excellent	30%
Thinning, Removal	Garlic Mustard	1	Spring	Spot	Excellent	0%
Thinning, Removal	Honeysuckle	1	Spring/ Summer/Fall	Spot	Excellent	0%
Thinning, Removal	Honeysuckle	30	Spring/Late fall	Spot	Good	<25%
Thinning, Removal	Honeysuckle	Many	Fall	Spot	Good	
Thinning, Removal	Honeysuckle, Barberry, Multiflora Rose	When seen	Winter/Spring Summer/Fall	Spot	Good – Excellent	<25%
Thinning, Removal	Honeysuckle/ Barberry	As needed	Winter/Spring Summer/Fall	Spot	Poor	0%
Thinning, Removal	Invasive plants	2 to 4	Spring/Fall	Spot	Good	0%
Mowing	Garlic Mustard	1	Spring	Spot	Poor	0%
		Range too large for meaningful average	Winter – 4, Spring – 9, Summer – 5, Fall – 10.	Spot – 15, Entire – 1.	Excellent – 5 Good – 9 Fair – 1 Poor – 2	Average = 7%
Shooting, Hunting	Deer	1	Fall		Good	<25%
Shooting, Hunting	Deer	1	Fall	Entire	Excellent	
Shooting, Hunting	Deer	2	Fall	Entire	Good	<25%
Shooting, Hunting	Deer	6	Fall		Poor	Unknown
Shooting, Hunting	Deer	In season	Fall		Fair	
Shooting, Hunting	Deer	In season	Fall		Poor	<25%
Shooting, Hunting	Deer	3 weeks	Spring/Fall	Spot	Good	
			Winter – 0, Spring – 1, Summer – 0, Fall – 7.	Spot – 1, Entire – 2.	Excellent – 1 Good – 3 Fair – 1 Poor – 2	Average = 13%
Shooting, Hunting	Bear	2	Winter		Poor	Unknown

Table B1 continued. Please list the **NON-PESTICIDE METHODS** used to manage or prevent pests.

Non-pesticide method(s)	Pest targeted	Number of Times Method Used in a Typical Year	When Method Used (Spring, Summer, Fall, Winter, or Month)	Type of Application (spot treatment, entire sugarbush, aerial etc.)	Effectiveness of Method (Excellent, Good, Poor)	Anticipated Loss of Yield if method not used (<25%, <50%, 50-75%, 100%,)
Shooting, Hunting	Grey squirrel	Ongoing	Winter/Spring Summer/Fall		Excellent	Unknown
Shooting, Hunting	Red squirrel	1	Fall	Entire	Excellent	
Shooting, Hunting	Red squirrel	2	Summer	Spot	Fair-Good	25%
Shooting, Hunting	Red Squirrel	2	Spring/ Summer		Good	
Shooting, Hunting	Red Squirrel	5	Spring		Excellent	
Shooting, Hunting	Red squirrel	Anytime	Winter/Spring Summer/Fall	Entire	Good	Unknown
Shooting, Hunting	Red squirrel					
Shooting, Hunting	Red squirrel	3 weeks	Spring/Fall	Spot	Good	
Shooting, Hunting	Squirrels	4	Spring		Poor	
Shooting, Hunting	Squirrels	Numerous	Fall/Winter	Spot	Fair	<25%
Shooting, Hunting	Squirrels	1	Spring	Entire	Poor	
Shooting, Hunting	Squirrels		As time allows		Poor	<25%
Shooting, Hunting	Squirrels	As needed	Winter/Spring Summer/Fall		Excellent	<20%
Thinning, Removal	Red Squirrel	1	Summer		Good	25%
Thinning, Removal	Red squirrel	2	Summer	Spot	Fair-Good	25%
Thinning, Removal	Squirrels	Every few years (0.3)	Fall	Spot	Good	prevents line damage
Dogs chase squirrels	Red squirrel	Continuous	Spring/Late fall	Entire	Poor	<50%
Mouse traps	Squirrels	2	Spring		Poor	
Instant potatoes	Squirrels	2	Spring		Poor	
		Average = 2.2	Win -4, Spr -11, Sum -7, Fall -8.	Spot - 5, Entire -5.	Exc-4 Good-7 Fair-3 Poor-6	Average = 19%
Shooting, Hunting	Porcupine	3 to 4	Winter/Spring	Spot	Good	
Shooting, Hunting	Porcupine	3 to 4	Winter/Spring Summer/Fall	Spot	Good	<25%
Shooting, Hunting	Porcupine	Ongoing	Winter/Spring Summer/Fall	Spot	Good	10%
Shooting, Hunting	Porcupine	1	Winter	Spot	Excellent	2%
Traps	Porcupine	10	Winter	Spot	Good	
Traps	Porcupine	3 to 4	Winter/Spring Summer/Fall	Spot	Good	<25%
Traps	Raccoon, Skunk	Daily	Summer		Good	Unknown
Shooting, Hunting	Woodpeckers & Flicker	Sugar season	Through sugar season	Entire	good	25-50%
		Average = 4.3	Win-6, Spr-4 Sum-4, Fall-3.	Spot - 6, Entire - 1.	Exc-4, Good-7 Fair-3, Poor-6	Average = 15%

Table B1 continued. Please list the **NON-PESTICIDE METHODS** used to manage or prevent pests.

Non-pesticide method(s)	Pest targeted	Number of Times Method Used in a Typical Year	When Method Used (Spring, Summer, Fall, Winter, or Month)	Type of Application (spot treatment, entire sugarbush, aerial etc.)	Effectiveness of Method (Excellent, Good, Poor)	Anticipated Loss of Yield if method not used (<25%, <50%, 50-75%, 100%,)
Pruning	Forest tent caterpillars	1	Spring	Spot	Good	<25%
Pruning	Gypsy Moth	3	Fall	Spot	Unknown	Unknown
Pruning	Tent caterpillar	1	Summer	Spot	Good	Unknown
Guinea Fowl	All bugs	Continuous	Spring/ Summer/Fall		Excellent	
Hand removal	Gypsy Moth larvae	2	Spring/ Summer	Spot	Good	0%
Lady bugs	Pear Thrips	3		Entire	Unknown	Unknown
Pruning larvae		Up to 6 (4)	Summer		Poor	<15%
Thinning, Removal	Gypsy Moth	1	April	Spot	Good	<20%
		Average = 1.8	Winter – 0, Spring – 3, Summer – 4, Fall – 2.	Spot – 5, Entire – 1.	Excellent – 4 Good – 7 Fair – 3 Poor – 6	Average = 8%
Reduced Tapping	Forest Tent	1	Spring	Entire		
Reduced Tapping	Pear Thrips	1	Spring	Entire		
Reduced Tapping	Pear Thrips	1	Spring	Spot	Good	<25%
Reduced Tapping		1	Late Winter	Spot	Good	<10%
Cows run in it						

Table B2. Please list the **PESTICIDES** used (if applicable), the pest(s) targeted, application details, and whether the control was excellent, good, or poor. (Please fill in your answers – be as specific as possible)

Pesticide	Pest(s) Targeted (Insect, Disease, Weed, Vertebrate)	Number of Applications in a Typical Year	When applied (Spring, Summer, Fall, Winter, or Month)	Type of Application (spot, entire, aerial, etc.)	Effectiveness of Pesticide (Excellent, Good, Poor)	Anticipated Loss of Yield if no pesticide was applied (<25%, <50%, 50-75%, 100%)
Insect control						
B.T. <i>Bacillus thuringiensis</i> toxin	Forest tent caterpillar	once in 2006	May	Aerial	Poor	<25%
B.T. <i>Bacillus thuringiensis</i> toxin	Forest tent caterpillar	1	Spring	Aerial	Good	Unknown
B.T. <i>Bacillus thuringiensis</i> toxin	Forest tent caterpillar	1	May	Entire, Aerial	Good	<25%
B.T. <i>Bacillus thuringiensis</i> toxin	Forest tent caterpillar	1	May	Aerial	Good	Unknown
B.T. <i>Bacillus thuringiensis</i> toxin	Forest tent caterpillar	1	Early summer	Entire	Excellent	<50%
Weed control						
glyphosate (Round Up)	Barberry	1 or 2	When found	Spot	Excellent	0%
glyphosate (Round Up)	Barberry, Beech, Briars	1	Summer	Spot	Good	0%
glyphosate (Round Up)	Bittersweet, Buckthorn, Poison ivy, Wild Mustard	1	Spring/Fall	Spot	Good	Unknown
glyphosate (Round Up)	Buckthorn, Honeysuckle	As needed	Fall	Spot	Good	
glyphosate (Round Up)	Garlic Mustard	1	Spring	Spot	Excellent	<25%
glyphosate (Round Up)	Multiflora rose	1	Summer/Fall	Spot	Good	None
glyphosate (Round Up)	Multiflora Rose	1	Summer	Spot	Excellent	0%
glyphosate (Round Up)	Multiflora Rose	2	Spring/Summer	Spot	Good	Unknown

Table C1. Please indicate how often each of the listed activities would require worker presence in the area within 30 days after that area had received a pesticide (insecticide, fungicide, herbicide etc.) application. (Please circle an answer for each)

Activity	Multiple times a year	Once a year	Rarely / Never
Hand weeding (17)	0	2	15
Pruning (16)	0	6	10
Thinning (16)	1	5	10
Scouting (16)	6	1	9
Tapping (17)	1	7	9

Table D1. Please select the option that best describes your use of monitoring for pests in your sugarbush (Circle the best answer)

Level of monitoring	Number of responses
No monitoring done	26 (19%)
Management based on informal observations	109 (80%)
Management based on formal monitoring (traps or other standard procedures and record keeping)	2 (1%)

Table D2a. How important are these information sources in making your pest management decisions? (Please circle an answer for each)

Source (number of ratings)	Very	Somewhat	Not
<i>The Maple Digest</i> (125)	35	56	34
<i>The Maple News</i> (120)	38	49	33
Web sites (108)	15	36	57
State Associations (121)	41	50	30
Educational meetings (119)	37	48	34
University/Extension staff (120)	31	52	37
County forester/Forest protection staff (114)	32	41	41
Other producers (99)	27	44	28
Other: Farming magazines (mentioned twice); Textbooks and other references, TV News, Bascom's, Goodrich, USDA & Northeast Regional Climate Center (all mentioned once).			

Table E1-6.

No response given indicated by —. 0 value responses shown as empty cells to improve readability.

– **How many acres of maple sugarbush did you manage in 2008?**

– **What is the approximate age range of your stand(s)?** (% of stand in different age groups).

– **How many taps did you put out in 2008?** Blank indicates no response given. “0” = zero given as response.

– **Over the past five years what is your average annual yield of maple syrup?**

* The ‘Taps per Acre’, ‘Gallons per Acre’, and ‘Gallons per Tap’ fields were not on the survey, but calculated from responses given to the ‘Acres’, ‘Number of Taps’, and ‘Average Annual Yield’ questions.

For responses given as a range, midrange value used for calculation.

Cells with “—” and 0 not used for calculation. “+” and “+/-” qualifiers ignored.

– **What percentage of your maple syrup is sold through each of these markets?**

Where values do not total to 100%, the remainder was for ‘gifts’, ‘home use’, etc.

– **How would you describe your production practices?** (Organic, Conventional, Other.)

Acres	Age of stand (years)					Taps		Yield			Marketing			Production practice
	% 0 to 20	% 20 to 40	% 40 to 60	% 60 to 80	% > 80	Number of Taps	* Taps per Acre	Average Gallons syrup	* Gals. per Acre	* Gals. per Tap	Whole -sale	Retail	Bulk	Org = Organic, Empty cell = Conven- tional
800				15	85	25,000	31	12,000	15	0.48		10%	90%	Org
700	—	—	—	—	—	50,000	71	—				50%	50%	Org
700	—	—	—	—	—	15,000	21	3,000	4.3	0.20	10%	50%	40%	Org
700+	15	23	55	5	2	1,300	2	350	0.5	0.27	50%	40%	5%	Org
600	20	60	10	5	5	25,000	42	7,500	12.5	0.30			100%	Org
500				50	50	350– 400	1	90+	0.2	0.24			100%	—
255	20		60		20	2000	8	200	0.8	0.10		100%		Org
250			30	40	30	4,000	16	1,200	4.8	0.30	5%	70%	25%	
220	10	30	20	20	20	12,600	57	5,670	25.8	0.45	80%	10%	10%	
203			50		50	—	—	—			—	—	—	—
160	10	30	30	20	10	4,300	27	1,200	7.5	0.28		100%		
156			20	20	60	4,500+	29	1,440	9.2	0.32	50%	50%		
150					100	8,943	60	2,882	19.2	0.32	85%	5%	2%	
150		20	60	20		8,700	58	2,500	16.7	0.29				
150	25	25	25	13	12	6,000	40	1,400	9.3	0.23	5%	5%	90%	Org
150	10	10	40	30	10	2,200	15	600	4	0.27		5%	95%	
120	15	5	25	45	10	10,000	83	3,500	29.2	0.35		5%	95%	Org
120	10	10	20	20	40	4,100	34	2,500	20.8	0.61	50%	25%	25%	
100			30	60	10	4,500	45	1,900	19	0.42	5%	20%	75%	Org
100	20	20	20	20	20	3,200	32	1,000	10	0.31	100%			Org
100	25				75	2,100	21	400	4	0.19		75%	25%	
100		60	10	10	20	2,100	21	900	9	0.43	50%	30%	20%	
100+	—	—	—	—	—	0		1,000	10		30%	60%	10%	

Acres	Age of stand (years)					Taps		Yield			Marketing			Production practice
	% 0 to 20	% 20 to 40	% 40 to 60	% 60 to 80	% > 80	Number of Taps	* Taps per acre	Average Gallons syrup	* Gals. per Acre	* Gals. per Tap	Whole -sale	Retail	Bulk	Org = Organic, Empty cell = Conven- tional
95			50	48	2	600	6	150	1.6	0.25	10%	90%		Org
90		30		60	10	3,100	34	800	8.9	0.26	40%	50%	10%	
90			80	20		2,600	29	740	8.2	0.28	30%	70%		
90	15	25	30	20	10	1,700	19	350	3.9	0.21	50%	45%	5%	
80	20	20	20	20	20	7,500	94	1,200	15	0.16	5%	95%		Org
80		30	70			5,000	63	1,000	12.5	0.20	25%	75%		
80		30	30	30	10	3,200	40	500	6.3	0.16		10%	90%	
75	10	20	50	10	10	5,000	67	800	10.7	0.16	20%	10%	70%	
75	5	15	40	30	10	2,500	33	450	6	0.18	20%	15%	65%	
70			100			8,000	114	2,700	38.6	0.34	80%	20%		
60-75		5	5	10	80	7,250	107	39-45	0.6	0.01	60%	10%	20%	
60	10	20	50	20		5,200	87	2,380	39.7	0.46	5%	70%	25%	
60					100	4,500	75	750	12.5	0.17	20%	80%		
60	10	10	60	10	10	4,300	72	1,075	17.9	0.25	10%		80%	
60				75	25	4,000	67	1,320	22	0.33	70%	30%		
60	5	10	60	20	5	2,200	37	450	7.5	0.20	20%	10%	70%	
60	10	10	30	25	25	2,100	35	500	8.3	0.24	20%	40%	40%	
50	10	25	50	10	5	4,000	80	1,500	30	0.38		10%	90%	Org
50	10	20	5	60	5	3,500	70	1,800	36	0.51	5%	35%	60%	Org
50	5	5	20	40	30	3,000	60	500	10	0.17		40%	60%	Org
50			20	70	10	3,000	60	600-800	14	0.23	5%	95%		
50				100		3,000	60	—				100%		—
50				80	20	2,850	57	500	10	0.18	20%	80%		
50	10	75	10	5		2,400	48	370	7.4	0.15	25%		75%	
50			50	50		1,800	36	180	3.6	0.10	75%	25%		Org
50+/-		30	30	30		1,325	27	255	5.1	0.19	20%	75%	5%	
50	15	15	30	40		1,200	24	150	3.0	0.13	50%	50%	0%	
50		50	40	10		1,000	20	120	2.4	0.12		90%	10%	Org
50			100			800	16	130	2.6	0.16		60%	40%	
50			50	40	10	400	8	150	3	0.38		100%		Org
50	10		10		80	300	6	100	2	0.33		100%		Org
48	5	30	65			2800	58	600	12.5	0.21	10%	70%	20%	Org
35-50	10	20	20	20	30	3,500+	92	1,000	26.3	0.29	25%	75%		Org (but used glyphosate)
41	10	20	60	10		1,100	27	100	2.4	0.09		100%		Org
40		50	40		10	2,500	63	650	16.3	0.26		20%	80%	Both
40	10	20	10	10	50	2,300	58	1,000	25	0.43	50%	30%	20%	Both
40	25	25	25	23	2	1,400	35	400	10	0.29		100%		Org

Acres	Age of stand (years)					Taps		Yield			Marketing			Production practice
	% 0 to 20	% 20 to 40	% 40 to 60	% 60 to 80	% > 80	Number of Taps	* Taps per acre	Average Gallons syrup	* Gals. per Acre	* Gals. per Tap	Whole -sale	Retail	Bulk	Org = Organic, Empty cell = Conven- tional
40	—	—	—	—	—	1,200	30	400	10	0.33	5%	95%		
40			100			1,200	30	—				100%		Org
40	10	10	15	15	50	800	20	180	4.5	0.23	100%			
40	—	—	—	—	—	120	3	15	0.4	0.13		100%		
35		25	25	50		2,000	57	300	8.6	0.15		95%	5%	
35		40	50		10	1,100	31	250	7.1	0.23	5%	95%		
35			50		50	500	14	45	1.3	0.09		20%		
30	5	10	50	25	10	3,000	100	325	10.8	0.11	40%	50%	10%	Org
30	10	10	10	20	50	2,000+	67	440	14.7	0.22	30%	60%	10%	
30	20	25	25	15	15	1,300	43	200	6.7	0.15	5%	75%	20%	
30		10		90		1,100	37	200	6.7	0.18	75%	5%	20%	
30		30	40	29	1	685	23	181	6	0.26	30%	70%		Org
30		20	80			Retired		275	9.2			100%		
30				100		Retired		—				100%		Org
27	5	10	10	70	5	1,940	72	500	18.5	0.26		20%	80%	
26	10	15	15	20	40	120	5	28	1.1	0.23	75%	25%		
25+/-	5	5	20	50	20	2,500+/-	100	450 +/-	18	0.18		100%		
25	10	20	25	25	20	2,000	80	200	8	0.10		75%	25%	
25			50	50		1,200	48	290	11.6	0.24	15%	10%	75%	Org
25		30	25	25	20	900	36	175	7	0.19		100%		
25				50	50	700	28	200	8	0.29		80%	20%	Org
25	10	30	30	20	10	500	20	125	5	0.25		50%	50%	
21		50	50			1,500	71	375	17.9	0.25	25%	75%		
20.1	10	20	60	10		281	14	25	1.2	0.09		100%		Org
20	10	10	40	40		2,500	125	700	35	0.28	80%	20%		Org
20			60	40		2,400	120	275	13.8	0.11	95%	5%		
20				75	25	1,600	80	250	12.5	0.16	50%	50%		
20			40	55	5	1,100	55	100	5	0.09	5%	95%		
20		10	70	15	5	1,100	55	170	8.5	0.15	50%	50%		Org
20	10	20	40	20	10	500	25	75	3.8	0.15		100%		Org
20			100			320	16	100	5	0.31		100%		Org
20				30	70	250	13	100	5	0.40		100%		Org
20				50	50	150	8	25–35	1.5	0.20		100%		
20		30	15	50	5	60	3	25	1.3	0.42		100%		
19	5	5	10	20	60	960	51	130	6.8	0.14		60%	40%	
17	10		70	20		200	12	24	1.4	0.12		5%	0%	
16			50		50	1,200	75	250	15.6	0.21		80%	20%	
16			80		20	450	28	60	3.8	0.13		100%		
12–20			100			400	25	65	4.1	0.16	80%	10%		

Acres	Age of stand (years)					Taps		Yield			Marketing			Production practice
	% 0 to 20	% 20 to 40	% 40 to 60	% 60 to 80	% > 80	Number of Taps	* Taps per acre	Average Gallons syrup	* Gals. per Acre	* Gals. per Tap	Whole -sale	Retail	Bulk	Org = Organic, Empty cell = Conven- tional
15	15	15	30	30	10	1,400	93	290	19.3	0.21	10%	90%		
15		50	30	20		1,300	87	300	20	0.23	50%	50%		Org
15	5			15	80	1,200	80	225	15	0.19		85%	15%	
15			25	50	25	1,200	80	450	30	0.38		100%		
15					100	1,000	67	150	10	0.15		100%		Org
15		90	10			900	60	98	6.5	0.11		100%		Org
15	10	30	50	10		750	50	130	8.7	0.17		90%	10%	
15	5	5	5	65	20	680	45	—					80%	
15	20	20	20	20	20	600	40	200-300	16.7	0.42	90%	10%		Org
15	25	25	50			600	40	50	3.3	0.08	20%	80%		
15			100			400	27	100	6.7	0.25	40%		60%	
15		75	15	10		400	27	49	3.3	0.12		95%	5%	
15	10	30	55	5		360	24	37	2.5	0.10	15%	85%		
15		50			50	350	23	70	4.7	0.20	50%	25%	20%	
15		20	20	30	30	335	22	100	6.7	0.30	10%			Org
15		25		75		0		100	6.7		100%			
15		20		80		0		125	8.3			60%		
14	5	35	35	20	5	1,200	86	320	22.9	0.27		10%	90%	Org
12	40	20	28	10	2	650	54	85	7.1	0.13	30%	60%	10%	
12	15	35	30	15	5	600	50	75	6.3	0.13	50%	50%		Org
10-12			50	25	25	700-800	68	80-90	7.7	0.11	—	—	—	
11	10	10	20	30	30	750	68	225	20.5	0.30	10%	90%		
10	10	50	25	10	5	1,000	100	200	20	0.20	5%	25%	70%	Org
10	10	10	10	20	50	920	92	200	20	0.22	40%	50%	10%	
10+/-		5	50	40	5	900+/-	90	150	15	0.17	5%	95%	0%	
10	10	10	50	20	10	800	80	50	5	0.06	All	for	gifts	
10		20	20	40	20	700	70	180	18	0.26	50%	50%		
10		10	75	10	5	600+	60	80	8	0.13	10%	90%		
10	15	30	35	15	5	500	50	60	6	0.12		100%		
10		30	60	10		425	43	50	5	0.12		75%	25%	Both
10		25	65		10	250	25	40	4	0.16		100%		Org
9	20	30	30	20		300	33	36	4	0.12		50%		
8	5	30	60	5		1,100	138	40	5	0.04	15%	85%		
7	5	10	70	10	5	650	93	100	14.3	0.15	70%	20%	10%	
7	10	60	20	7	3	350	50	40	5.7	0.11		75%	25%	
6			100			450	75	35	5.8	0.08		100%		Org
6	10		80		10	415	69	85	14.2	0.20		100%		
5	20	20	30	20	10	900	180	100	20	0.11		90%	10%	
5		40	60			425	85	100	20	0.24		98%		

Acres	Age of stand (years)					Taps		Yield			Marketing			Production practice
	% 0 to 20	% 20 to 40	% 40 to 60	% 60 to 80	% > 80	Number of Taps	* Taps per acre	Average Gallons syrup	* Gals. per Acre	* Gals. per Tap	Whole -sale	Retail	Bulk	Org = Organic, Empty cell = Conven- tional
5	10	30	60			400	80	70	14	0.18	20%	40%	40%	
5		80	10	10		275	55	46	9.2	0.17		100%		Org
5	25	43	20	10	2	195	39	30	6	0.15		60%		Org
5		5	20	75		85	17	20-22	4.2	0.25		100%		
5	80	10	10			30	6	4	0.8	0.13				Org
4	30	40	30			725	181	150	37.5	0.21	10%	90%		
4			100			700	175	95	23.8	0.14		20%	80%	
3		10			90	600	200	70	23.3	0.12	Inn	guest	gifts	Org
3		20	38	40	2	314	105	30	10	0.10		95%		Org
2-4	20	25	40	5	10	300	100	30-40	11.7	0.12	49%	50%	1%	Both
3	10	30	40	10	10	200	67	40+	13.3	0.20		100%		
3			35	30	35	150	50	30	10	0.20	50%	25%		
2				80	20	175	88	46	23	0.26	20%	80%		
2	10	30	40	20	0	100	50	25	12.5	0.25		100%		
1	20	20	60			32	32	2.5	2.5	0.08	—	—	—	Org
0.5			30		70	6	12	1.5	3	0.25	All	for	gifts	Org
—		28	50	20	2	800	—	200		0.25		100%		Org
—	10	20	40	20	10	500	—	75		0.15		20%	80%	
—			25	25	50	400+/-	400	80+/-	80	0.20		100%		Org
—	30	60	10			350	—	20		0.06		100%		Org
—	10	10	40	40		300	—	60		0.20	80%	20%		

Table F1. Please list needs or ideas (as many as you wish) you think should be given high priority for sugarbush pest management <u>RESEARCH</u> .
Insect pests
Asian Longhorned Beetle prevention and control (20)
Insect pest control (nonspecific) (6)
Emerald Ash Borer prevention and control (3)
Biocontrol of insect pests (3)
Organic insect control (2)
Maple Borer, organic control
IPM for insect pests
Guinea Fowl for insect pest control and soil pH
Pest control (nonspecific)
Geographical pest locations & physical location on tree
Better ways to track pests:
Weeds
Invasive plant control without herbicide or organic (2)
Multiflora rose (2)
Buckthorn
Garlic mustard
Invasive plants
Japanese Barberry
Other pest topics
Animal pests (2). e.g. 'Effective spray to deter squirrel and deer from chewing'.
Does cleaning tubing w/ water increase squirrel damage?
Woodpecker
Invasive pests (nonspecific)
Experts to visit sugarbushes to look for pests
Ecosystem
Acid rain (2)
Global warming
Symbiotic relationship (if any) between ash (generic) and maple
Sap collection topics
Fewer taps per tree
Impact of smaller spouts and vacuum
Marketing
Marketing, possibly coop to control price swing from wholesale buyers

Table F2. Please list needs or ideas (as many as you wish) you think should be given high priority for sugarbush pest management EDUCATION.
Insect pests
Asian Longhorned Beetle prevention and control (13)
Publicity and education for the general public to help in detection of Asian Longhorned Beetle and other pests (9)
Classes, presentations, workshops for maple producers (7)
Emerald Ash Borer (2)
Sugar Maple Borer
Forest Tent Caterpillar
Weeds
Multiflora rose (2)
Buckthorn
Invasive plant
Other pest topics
High emphasis on pests (2)
Animal pests
Invasives
Organic pest control
Hardwood forest health
Guinea fowl for pest control
Information and Services
Newsletter, Email updates (7) e.g. – ‘Newsletters to help monitor pests, what’s the best time of year or how/where to look’. ‘Extension get the word out’.
Printed material on maple pests (4), e.g. ‘A small handbook with color photos of damage for sugarmakers to use’, ‘best management practices’.
Easier access to information, List of contacts for different sugarbush pest problems (3)
Identify pests and let producer know. Yearly pest checks. (2)
Extension website for sugar makers, online materials, DVD (2)
Continue agriculture funding at University
Production topics
Red maple tapping

Table F3. Please list needs or ideas (as many as you wish) you think should be given high priority for sugarbush pest management REGULATORY CHANGES.
Insect pests
Asian Longhorned Beetle (6), e.g. 'Need protocol if ALB found in a sugarbush'.
Restrict movement of firewood and wood products (4)
Restrict movement of noxious plants (3), e.g. by mail order catalogs, landscapers.
Better import controls on pests
Emerald Ash Borer
Other
Anti-regulation, e.g. 'As few as possible', 'Let everybody regulate their own property' (6)
Keep out pesticides unless organic
Any changes have to be simple, otherwise they won't work

Table F4. Any other comments about maple sugarbush pest management or this survey?
Asian Longhorned Beetle is threat, keep up research and education on ALB, get rid of ALB, etc. (3)
Do not have any real problems etc. (3)
Invasive plants need chemical control
Our main problem with our maples is road salt. We have been losing 10-15 trees per year due to run off from roads.
Would be nice to be able to go to the state and have them spray for pest as needed.
Make sure the Proctor Maple Research stays going.
The ME Forest Service and campground owners are doing a good job of warning the public of pests spreading.
Continue to support & work with NH Maple Producers Assoc., State & Coop. Extension.
Limit number of maples harvested each year, keep healthy trees producing syrup, not for lumber.
State should fund a pH and lime application survey in every sugarbush
Who is my best resource when I find a problem in my sugarbush? How can I get answers to these questions?
How do you become organic?
This is a start, might be wise to send out another survey after for unanswered questions.
Survey difficult because answers vary